phyceae are the next younger group of algae, descended partly from Rhodophyceae and partly from flagellate-like organisms. (5) The Zygophyceae are derived from flagellated ancestors, the Peridinales being most nearly related to the modern flagellates. (6) The Chlorophyceae are the youngest of the algae, and have come partly from Rhodophyceae and partly from flagellated ancestors. —S. YAMANOUCHI.

Sporangia and spores of Aneimia.—STEVENS[29] has investigated the development of the sporangia and spores in a species of *Aneimia*. He finds that the two tapetal layers break down at the mother cell stage, freeing the protoplasts and resulting in a tapetal plasmodium, as among the Ophioglossales. It was in connection with work on *Botrychium* (1906) that STEVENS proposed the excellent descriptive phrase "tapetal plasmodium." Perhaps it was a slip that he did not include this earlier paper in the "literature cited," or the still earlier paper of CARDIFF (1905). Upon the separation of the mother cells in *Aneimia* the plasmodium entirely surrounds each one. As each mother cell lies imbedded separately in the plasmodium, no wall is seen, and when the tetrad is formed the mother cell membrane persists about it. At the separation of the spores of a tetrad, the tapetal plasmodium flows between them. The author thinks that the thickness of the exine "is the work of the tapetal plasmodium." It is becoming more and more evident that in structure and behavior the Ophioglossales and Filicales belong together.—J. M. C.

Chromosomes in maize.—KUWADA[30] has studied the nuclear conditions in the pollen mother cells of nine different races of corn: red starch corn, yellow starch corn, amber rice popcorn, black starch corn, golden broach field corn, white flint corn, sugar corn, early light sugar corn, and red sugar corn. The number of gemini in these different races varies from 9 to 12, the sugar corns having generally a larger number than the starch corns. He thinks that the smaller number was reduced from 12, which is the original number for all the races of *Zea Mays*. The size and shape of the gemini in a figure differ, and there is present always a duplication of each of the gemini. In the equatorial plate of the homotypic division some pairs of chromosomes come in contact with each other. He suggests that the production of innumerable races of *Zea Mays* might have a certain relation to the duplication of chromosomes, resulting in the double number derived from the original form, which had probably 6 chromosomes as the reduced number.—S. YAMANOUCHI.

Botryopteris antiqua.—This interesting paleozoic fern, described by KIDSTON in 1908 from inadequate material, has been studied by Miss BENSON[31]

[29] STEVENS, WILLIAM CHASE, On the development of the sporangia and spores of *Aneimia phyllitidis*. Ann. Botany **25**:1059–1068. *pls. 84, 85*. 1911.

[30] KUWADA, Y., Maiosis in the pollen mother cells of *Zea Mays* L. Bot. Mag. Tokyo **25**:164–181. *pl. 6. figs. 4*. 1911.

[31] BENSON, MARGARET, New observations on *Botryopteris antiqua* Kidston. Ann. Botany **25**:1045–1057. *figs. 3. pls. 81–83*. 1911.